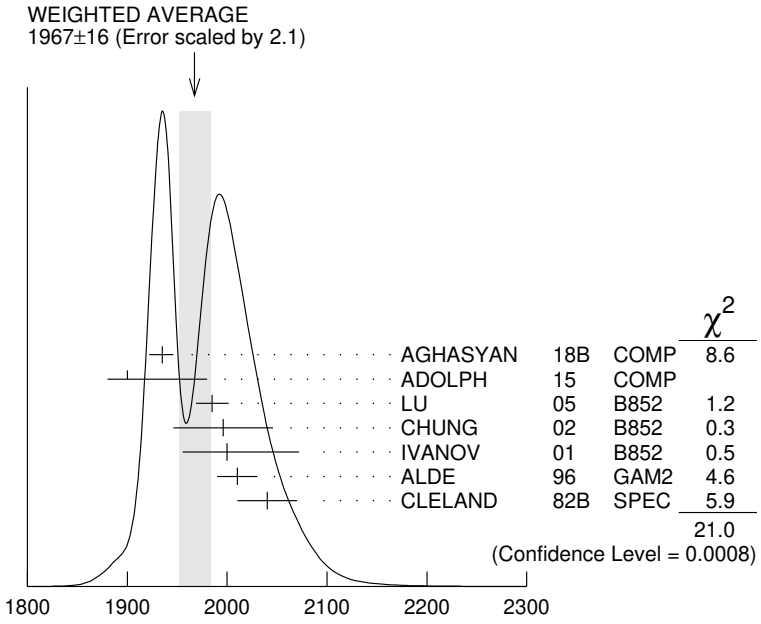
$a_4(1970)$

$I^G(J^{PC}) = 1^-(4^{++})$

$a_4(1970)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1967±16 OUR AVERAGE		Error includes scale factor of 2.1. See the ideogram below.				
1935^{+11}_{-13}	46M	[1] AGHASYAN	18B	COMP		190 $\pi^- p \to \pi^-\pi^+\pi^- p$
1900^{+80}_{-20}		ADOLPH	15	COMP		191 $\pi^- p \to \eta^{(\prime)}\pi^- p$
1985±10±13	145k	LU	05	B852		18 $\pi^- p \to \omega\pi^-\pi^0 p$
1996±25±43		CHUNG	02	B852		18.3 $\pi^- p \to 3\pi p$
$2000\pm40^{+60}_{-20}$		IVANOV	01	B852		18 $\pi^- p \to \eta'\pi^- p$
2010±20		[2] ALDE	96	GAM2	0	38 $\pi^- p \to \eta\pi^0 n$
2040±30		[3] CLELAND	82B	SPEC	±	50 $\pi p \to K^0_S K^\pm p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$1885\pm13^{+50}_{-2}$	420k	[4] ALEKSEEV	10	COMP		190 $\pi^- Pb \to \pi^-\pi^-\pi^+ Pb'$
2004± 6	80k	[5] UMAN	06	E835		5.2 $\overline{p}p \to \eta\eta\pi^0$
2005^{+25}_{-45}		[6] ANISOVICH	01F	SPEC		2.0 $\overline{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$
1944± 8±50		[7] AMELIN	99	VES		37 $\pi^- A \to \omega\pi^-\pi^0 A^*$
1903±10		[8] BALDI	78	SPEC	−	10 $\pi^- p \to p K^0_S K^-$
2030±50		[9] CORDEN	78C	OMEG	0	15 $\pi^- p \to 3\pi n$



$a_4(1970)$ MASS (MeV)

[1] Statistical error negligible.

[2] From a simultaneous fit to the G_+ and G_0 wave intensities.

[3] From an amplitude analysis.
[4] Superseded by AGHASYAN 2018B.
[5] Statistical error only.
[6] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.
[7] May be a different state.
[8] From a fit to the Y_8^0 moment. Limited by phase space.
[9] $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.

$a_4(1970)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
324^{+15}_{-18} OUR AVERAGE						
333^{+16}_{-21}	46M	[1] AGHASYAN	18B	COMP		190 $\pi^- p \to \pi^-\pi^+\pi^- p$
300^{+80}_{-100}		ADOLPH	15	COMP		191 $\pi^- p \to \eta^{(\prime)}\pi^- p$
$231 \pm 30 \pm 46$	145k	LU	05	B852		18 $\pi^- p \to \omega\pi^-\pi^0 p$
$298 \pm 81 \pm 85$		CHUNG	02	B852		18.3 $\pi^- p \to 3\pi p$
$350 \pm 100^{+70}_{-50}$		IVANOV	01	B852		18 $\pi^- p \to \eta'\pi^- p$
370 ± 80		[2] ALDE	96	GAM2	0	38 $\pi^- p \to \eta\pi^0 n$
380 ± 150		[3] CLELAND	82B	SPEC	$\pm$	50 $\pi p \to K^0_S K^\pm p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$294 \pm 25^{+46}_{-19}$	420k	[4] ALEKSEEV	10	COMP		190 $\pi^- Pb \to \pi^-\pi^-\pi^+ Pb'$
401 ± 16	80k	[5] UMAN	06	E835		5.2 $\overline{p}p \to \eta\eta\pi^0$
180 ± 30		[6] ANISOVICH	01F	SPEC		2.0 $\overline{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$
$324 \pm 26 \pm 75$		[7] AMELIN	99	VES		37 $\pi^- A \to \omega\pi^-\pi^0 A^*$
166 ± 43		[8] BALDI	78	SPEC	$-$	10 $\pi^- p \to p K^0_S K^-$
510 ± 200		[9] CORDEN	78C	OMEG	0	15 $\pi^- p \to 3\pi n$

[1] Statistical error negligible.
[2] From a simultaneous fit to the G_+ and G_0 wave intensities.
[3] From an amplitude analysis.
[4] Superseded by AGHASYAN 2018B.
[5] Statistical error only.
[6] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.
[7] May be a different state.
[8] From a fit to the Y_8^0 moment. Limited by phase space.
[9] $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.

$a_4(1970)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\overline{K}$	seen
Γ_2	$\pi^+\pi^-\pi^0$	seen
Γ_3	$\rho\pi$	seen

Γ_4	$f_2(1270)\pi$	seen
Γ_5	$\omega\pi^-\pi^0$	seen
Γ_6	$\omega\rho$	seen
Γ_7	$\eta\pi$	seen
Γ_8	$\eta'(958)\pi$	seen

$a_4(1970)$ BRANCHING RATIOS

$\Gamma(K\overline{K})/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	BALDI	78	SPEC	$\pm$	10 $\pi^- p \to K^0_S K^- p$

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	CORDEN	78C	OMEG	0	15 $\pi^- p \to 3\pi n$

$\Gamma(\rho\pi)/\Gamma(f_2(1270)\pi)$ Γ_3/Γ_4

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$1.7^{+0.9}_{-0.8}$ OUR AVERAGE Error includes scale factor of 3.7.					
$2.9^{+0.6}_{-0.4}$	46M	[1] AGHASYAN	18B	COMP	190 $\pi^- p \to \pi^-\pi^+\pi^- p$
$1.1\pm0.2\pm0.2$		CHUNG	02	B852	18.3 $\pi^- p \to 3\pi p$

[1] Statistical error negligible.

$\Gamma(\eta\pi)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	ALDE	96	GAM2	0	38 $\pi^- p \to \eta\pi^0 n$

$\Gamma(\eta'(958)\pi)/\Gamma(\eta\pi)$ Γ_8/Γ_7

VALUE	DOCUMENT ID		TECN	COMMENT
0.23 ± 0.07	ADOLPH	15	COMP	191 $\pi^- p \to \eta^{(\prime)}\pi^- p$

$\Gamma(\omega\rho)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen	145k	LU	05	B852	18 $\pi^- p \to \omega\pi^-\pi^0 p$

$a_4(1970)$ REFERENCES

AGHASYAN	18B	PR D98 092003	M. Aghasyan *et al.*	(COMPASS Collab.)
ADOLPH	15	PL B740 303	M. Adolph *et al.*	(COMPASS Collab.)
ALEKSEEV	10	PRL 104 241803	M.G. Alekseev *et al.*	(COMPASS Collab.)
UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)
LU	05	PRL 94 032002	M. Lu *et al.*	(BNL E852 Collab.)
CHUNG	02	PR D65 072001	S.U. Chung *et al.*	(BNL E852 Collab.)
ANISOVICH	01F	PL B517 261	A.V. Anisovich *et al.*	
IVANOV	01	PRL 86 3977	E.I. Ivanov *et al.*	(BNL E852 Collab.)
AMELIN	99	PAN 62 445	D.V. Amelin *et al.*	(VES Collab.)
		Translated from YAF 62 487.		
ANISOVICH	99C	PL B452 173	A.V. Anisovich *et al.*	
ANISOVICH	99E	PL B452 187	A.V. Anisovich *et al.*	
ALDE	96	PAN 59 982	S.V. Donskov *et al.*	(GAMS Collab.) IGJPC
		Translated from YAF 59 1027.		

CLELAND	82B	NP B208 228	W.E. Cleland *et al.*	(DURH, GEVA, LAUS+)
BALDI	78	PL 74B 413	R. Baldi *et al.*	(GEVA) JP
CORDEN	78C	NP B136 77	M.J. Corden *et al.*	(BIRM, RHEL, TELA+) JP